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The Role of Aviation in Military Operations at Sea

by

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The gigantic development of missile weapons compels one to ask the question: Will the missile in its triumphal advance diminish the role which manned aircraft have played up to now in military operations at sea? One must answer quite categorically: Not only will it not diminish, but rather, on the contrary, giving aviation more perfected weapons will even increase this role in the foreseeable conditions of warfare. To demonstrate this is the aim of this article.[1]

Two dual, basic strategic missions have always stood and still stand before the navy: operations on sea (ocean) communication lines, and operations in connection with the coast; in each case combat is conducted against enemy objectives and for protection of one's own installations.

Previously, which is very important, to these basic strategic missions was added, so to speak, an operational mission - the battle for supremacy at sea, which facilitated the accomplishment of both primary missions. As a practical matter, it also developed into a strategic, and in many cases, even into the foremost of strategic missions, inasmuch as its more or less successful execution (by destroying or blockading the enemy's fleet) automatically led to a suitable level of accomplishment of the basic missions.

At the present time, this battle for supremacy at sea has changed its meaning and character to a significant extent. First, under conditions of the diversity and the dispersion of naval power (including here, above all, aviation), it is almost impossible to neutralize or blockade the forces of the enemy so as to completely curb his activity; submarines and aircraft, especially pilotless, have broken "the law of numbers", so that within known limits they can operate even where the enemy has superiority of forces. Second, for the accomplishment of some missions, such preliminary neutralizing or blockading of the enemy's forces is not required. Third, modern combat against the main forces of the enemy - aircraft carriers or

1 While the present article deals with the question in an operational-strategic context and perspective, in the Collection of Articles (Sbornik statey) No. 4 of the "Naval Collection" (Morskoy Sbornik) Journal for 1960, in the article of P.P. Nevzorov, the same question is examined from operational-tactical positions.

missile submarines - has as its goal, primarily, not indirect, but direct and immediate protection of one's own installations from their influence, and not only the naval but, primarily, land installations.

Undoubtedly, operations against enemy sea (ocean) communication lines and against shore installations in a number of cases already can be executed not only by naval and air forces, but also by land-based (nazemnoye) missiles. To be precise, sea (ocean) communication lines of themselves also include, along with those at sea, shore installations such as ports, hydrotechnical facilities, etc. But while earlier, because of the limited capabilities of naval weapons, the basic objectives on sea (ocean) communication lines were vessels at sea, now such basic objectives are frequently becoming those on shore.

Therefore, the question is what is more "profitable": to destroy all these objectives with land-based missiles or those from "intervening" (promezhtochnyy) missile carriers - submarine, surface, or air? Even elementary calculations show that a uniform solution to this question in all cases is impossible: Under varied conditions it is advantageous to use varied forces and weapons.

If one has in mind the probable enemy's stationary ground installations which are separated from us by water and whose precise locations we know, it would seem in all cases more advantageous to destroy them with land-based missiles, for this saves us not only from losses of missile carriers, but also from the necessity for creating these carriers.

However, in a number of cases, depending on the distances, on the nature of the antiaircraft and antimissile defense of the enemy, and on other elements of the situation, the use of "intervening" carriers may be fully warranted, partly because of the feasibility of simplifying construction and decreasing the size, weight, and hence, the cost of the missiles, partly because of their great accuracy of hit at lesser distances from the target, partly because mobile "intervening" carriers are less vulnerable to the enemy's missiles than fixed land-based launching installations, partly because these carriers may be needed anyway for performing other missions, and finally, as a result of the necessity for the enemy to expend weapons in these cases to combat the missiles and their carriers.

If one takes as a unit the military-economic cost of destroying in the initial period of a war not less than 15 to 20 percent of an

enemy industrial area measuring 60 by 20 kilometers by intercontinental ballistic missiles with nuclear warheads, then with regard to all the conditions enumerated, as well as the probable losses, the cost of accomplishing this mission by atomic submarines will be approximately the same, by diesel submarines-twice as much, by cruise missiles from land bases - three times as much, and by aircraft - several times more expensive. The expenditures of the enemy to counteract these strikes will be: for operations against missiles - 6 or 7 corresponding units, against aircraft - about 15, and against submarines - 20 to 30 units.[1]

Undoubtedly, these calculations, in view of their extraordinary importance, must be verified repeatedly and be defined more precisely for the most diverse conditions, for, depending on the situation, it will be advantageous to use one or another method of delivering missiles to the target.

If one speaks of "intervening" carriers, then it is very clear that it will be more expedient to use aircraft in case of relative weakness of the antiaircraft defense (PVO),and to use submarines in case of relative weakness of the enemy's antisubmarine defense (PLO).

Thus, one may conclude that in operations against enemy shore installations the role of aviation under modern conditions is rather modest, although in some cases it is not ruled out. It is more advantageous to use land-based and submarine missiles against such installations.

Let us proceed to an examination of methods of operation against mobile sea (ocean) objectives: the transportation means of the enemy, as well as his combat large units (soyedineniye) and vessels. The picture here is drastically changed.

The level of development of missile technology theoretically even now permits the destruction of any objective in any area of the world ocean by land-based cruise missiles, and in certain cases even by ballistic missiles. And, if one speaks of offshore (pribrezhnaya vodnaya) zones saturated with technical shore surveillance means, then such a solution to the problem, at least in relation to surface objectives, as a practical matter, is not only feasible, but in many cases even more advantageous.

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1 An exposition of the methodology of these calculations requires a separate place.

In which cases? In those where the extent of the development of a theater facilitates the creation of the necessary system of missile launchers and shore installations in general. If this does not exist, then it is evident that it is simpler to utilize, for these targets, mobile forces and weapons, primarily aircraft. This question must also be solved on the basis of military-economic calculations based on initial operational-tactical requirements.

The width of the coastal zone now consists of several hundred kilometers and, in accordance with the development of technology, is growing continually. Extensive investigation must define precisely the order of this growth in the near future, but in any case one must consider that in some offshore naval theaters land-based missiles already are becoming the backbone of naval forces.

It may be asked: Why are land-based missiles regarded as a naval force, even if only provisionally? For the same reasons that "one gun on shore is worth ten guns on a vessel", as has been correctly assumed up to now, considering that one of the basic elements of naval forces is the so-called shore defense, including, above all, artillery. A naval direction is not necessarily connected only with vessels; it is connected with those forces and weapons by means of which it is more advantageous to accomplish the existing missions.

Concerning combat with submarines, in this zone the solution to the question depends on the method selected by us for detecting them. If this mission is assigned to fixed means (which at present can work only on the basis of hydroacoustics) having good communications with the shore, then detected submarines could be destroyed from the shore under conditions in which this will not disrupt the system of detection. But if the search and location of submarines is done by mobile forces, then these, naturally, will have the mission of destruction. As is known, the leading place among these forces belongs to aircraft, including helicopters.

Thus, the nature and degree of importance of one or another mission of aircraft in our offshore zone depends on the situation. But if the basic weapon against enemy surface forces in some cases is land-based missiles, then in combat against his submarines a prominent place, along with small vessels, as before, belongs to aircraft, in particular helicopters.

It must be added that if the operational range of shore missile

weapons is superior to the range of shore technical means of surveillance and target designation, then in this "external" part of the offshore zone the significance of aviation will grow still more as a result of the assignment to it of the mission of surveillance (reconnaissance), target designation, and, when needed, guidance.

We shall turn to an appraisal of possible methods of operations against mobile enemy objectives located outside the offshore zone just examined. If one speaks of enemy submarines, then, naturally, detection and destruction of them outside the offshore zone by some type of fixed or shore means is impracticable, and may be accomplished only by surface and air forces. If one speaks of surface ocean objectives, then elementary calculations show that the destruction of them from the land, although possible, demands such cumbersome missiles and such a complicated system of target designation and guidance that in an overwhelming majority of cases it is much more profitable to destroy them with missiles from mobile, specifically "intervening", carriers. Which carriers in this realm are most advantageous - submarine, surface, or air?

As is known, we have set aside surface ocean forces as a result of a number of considerations. Therefore, the discussion may proceed solely with submarine or air forces.

Unfortunately, the requisite comprehensive examination of this question does not yet exist. Preliminary calculations permit one to assert that the most advantageous carrier of weapons at sea is indeed aviation.

The experience of history confirms this concept. Thus, while in the First World War, aviation, especially at sea, only spread its wings, in the Second World War, its share was already from one-third to one-half of the destroyed and damaged combat vessels and ships of all combatant nations. As long as manned aviation is compared here, not with missiles (for it itself uses missiles), but with the other "intervening" carriers - surface and submarine, then there is no doubt that this process of the increasing role of aviation in operations in open sea (ocean) theaters will continue. In addition, without the assistance of aviation, the operations of submarines, especially diesel, are made much more difficult.

Concerning intelligence, as is known, even with the comparatively favorable ratio of the rates of speed of German submarines on the surface and merchant ships in the First and Second World Wars (respectively

10 to 15 knots for the submarines and 6 to 10 knots for the transports), the effectiveness of the submarines' combat operations depended to an extraordinary degree on their receipt of timely and precise data on the movement of convoys and ships. Now the ratio of these speeds is becoming all the more unfavorable for diesel submarines (15 to 18 knots for them and 10 to 16 knots for the transports). But in addition, while submarines traveled on the surface in the past war, especially at night, comparatively without hindrance, and were able to overtake and repeatedly attack convoys, now, with the widespread participation of aviation in antisubmarine defense, this is almost ruled out. The underwater speed of diesel submarines with regular use of the RDP (submerged diesel operation-rabota dizelya pod vodoy) apparatus does not exceed an average of 4 or 5 knots.

As a result, when the enemy has at his disposition routes in an ocean zone with a width of 500 to 600 miles, then for dependable assurance of only a single attack of a convoy by a group of submarines, it is necessary to deploy ahead of this group two reconnaissance screens of 15 to 20 submarines each. With a coefficient of operational utilization[1] of diesel submarines of not more than 0.1 to 0.15 for such uninterrupted reconnaissance (and only for reconnaissance), it would be necessary to have for only one ocean direction, not considering possible losses, 200 to 400, or as an average, about 300 submarines, at a total cost of 12 to 15 billion rubles. Meanwhile, for the accomplishment of the same reconnaissance mission by aviation, with two or three flights daily by paired flights of aircraft and with an intensity of 6 to 8 flights per month for one aircraft, 16 to 30 are needed, or an average of 20 to 25 aircraft with a total cost of 1 to 1.5 billion rubles. Figures are eloquent, and with regard to possible losses, such a comparison will be still more to the disadvantage of diesel submarines.

Of course, the mission of reconnaissance now can also be accomplished by pilotless means. If one bears in mind the long-term possibilities in this connection of artificial earth satellites (ISZ), which could systematically give a complete picture of movement on the oceans, then the conclusion follows that the speedy realization of that prospect should be worked at persistently. But if the discussion concerns the so-called reconnaissance missiles, then they, especially from submarines, may be launched only for

1 By coefficient of operational utilization is understood the relation of the time of the submarine's stay in the area of combat operations (i.e., without taking into account the time/remainder of footnote missing/.

tactical elaboration of an already known operational situation, and to effect reconnaissance of the latter is actually much simpler and more convenient with the aid of manned aircraft.

Perhaps these calculations and conclusions will appear to someone to be exaggerated. But, it is enough to analyze the experience of the Second World War, in particular the extraordinary decrease in the effectiveness of the operations of German submarines because of their poor aerial reconnaissance support, in order to arrive at the same conclusions. And since at present the main bulk of submarines still have diesel-electric engines, the question of supporting submarines with aerial reconnaissance is exceptionally important.

Of course, nuclear submarines present another perspective. Considerably surpassing in their submerged speed the average speed of convoys, they can combine reconnaissance with attacks, even repeated attacks. Calculations still show that aerial reconnaissance can also substantially increase their effectiveness.

The close combat assistance of aviation is no less important for diesel submarines. Being obliged regularly to proceed under RDP from one fourth to one third of the time, for recharging their batteries, even though not rising to the surface, diesel submarines all the same are comparatively easy to detect by the radiotechnical means of the enemy's aviation. Hence, for a more or less reliable guarantee of their security, regular combat against enemy aviation is necessary - a mission which, on the ocean again, can be accomplished only by a sufficiently long-range (avtonomnaya) and powerful combat aviation.

There is no doubt that operational and combat coordination with aviation is also advantageous for nuclear submarines. Thus, the role of aviation in combat against mobile objectives of the enemy on the ocean, i.e., against his combat forces, primarily aircraft carriers, and against his convoys and transports, has even increased; moreover, not only directly in relation to combat, but also in the realm of supporting operations of submarines, especially diesel submarines. It may be asserted that now a greater role in operations at sea in general belongs to aviation.

Up to this point the discussion has concerned itself with the possible participation of aviation in the fulfilment of the first, "offensive", half of both basic missions of naval forces - operations

against the shore and against ocean objectives of the enemy. At the same time, a second, "defensive", half of the first mission has appeared for examination, i.e., the defense of one's own shore installations, since operations against enemy aircraft carriers and submarines are really the execution of this mission.

What is the possible role of aviation in fulfilling the second half of the second mission, i.e., in the defense of one's own communication lines? If one speaks of the very real, for us, securing of them in the immediate offshore zone (with a depth in modern conditions, as has already been noted, of several hundred kilometers), then depending on the situation, land-based missiles and aviation must serve as the basic means of defense of communication lines from surface forces of the enemy.

Our small vessels of the patrol boat (storozhevoy kater) class ("subchasers" - okhotnik), together with aviation can fully protect shore communication lines from the submarines and air forces (VVS) of the enemy. It should be noted that in spite of some views the possibilities for aerial combat will in no way be curtailed. The history of the development of weapons irrefutably proves that when the conduct of combat by conventional means between any types of newly appearing major elements of armed forces (weapons carriers) becomes impossible, then human ingenuity finds a way out of the situation by creating new combat means. Thus it is here. While the tremendous speeds and great turning radii of modern airplanes prevent visual observation of the enemy and the utilization of cannon-machine gun armament against him, technical means of surveillance are arriving to assist the eye, missiles are appearing in place of machine guns and cannons, and the work of the brain is made easier by electronic computers.

Of course PVO vessels carrying a number of antiaircraft missiles, as well as helicopter vessels of the PLO, could also be useful for these purposes. However, the role of the PVO vessels will be too passive: owing to the short range of operation of their weapons, they cannot combat the enemy's aviation itself, but only the missiles launched by it. Concerning helicopter vessels, for each specific direction, one must consider whether it is not more advantageous to have landing areas for the helicopters on shore in place of the helicopter vessels.

There is no doubt, finally, that the transports themselves can be equipped with antiaircraft missile launchers and that they also

can carry helicopters.

Thus, for the defense of close communication lines, shore-based aviation, including helicopters, have, as before, vital importance. What is its possible role in securing distant ocean communication lines? It must be said directly, that with its present range, aviation is not in a position to defend ocean communication lines, and that the defense of them now is feasible only for aircraft carrier aviation. This is precisely why the USA continues to build aircraft carriers - vessels which in their time were actually born from the insufficient range of aviation: our enemy cannot manage without ocean communications, and without aircraft carriers these communications are indefensible.

Of course, aircraft with a long flight range could, being based on the shore or near the shore, cover ocean convoys or large units of surface vessels "in watches" ("povakhtenno"), taking off from the shore and returning there. But the cost of such coverage will turn out to be less than the cost of aircraft carrier support only when the shore-based aircraft gain not less than several days' range.

This is why, while continuing in the meantime to construct aircraft carriers, the Americans at the same time have been working strenuously in recent years on the creation of a nuclear power plant for aircraft. There is no doubt that we have every possibility of outdistancing the USA in this connection.

But if sufficiently long-range (avtonomnyy) and cargo-carrying aircraft are created, then perhaps with their assistance transoceanic transport can be realized, at any rate, military.

To this, one may answer that cargo merchant marine transport will be retained in the foreseeable future owing to its great economy in comparison with air transport, and on the strength of the fact that along with regularly scheduled, there will always be irregular transport (seasonal, etc). In connection with passengers, the situation is different: even now, more and more people prefer air travel to travel by sea. In wartime the situation changes still more. During the Korean War, 1950-1953, the Americans transported by air about 5 million persons (true, in the same time, about 80 million persons by sea) and about 0.08 percent of all cargo. But the application of nuclear power to aviation will undoubtedly open here completely new perspectives in the area of the freight-carrying capacity of individual aircraft and in relation to the overall freight-carrying capacity of aviation.

Will the cumbersome shipment of troops by sea transport still remain? It is doubtful. But the role of aviation in military operations at sea will become even more important.

We shall summarize our arguments by means of a small table.

The Role of Shore-Based Aviation in Military Operations at Sea

Missions of Naval Forces			The Role of Aviation in Modern Conditions and in the Future
Operations in relation to shore installations	Against installations of the enemy		Manned aviation yields its role to pilotless aviation, but in some cases may be utilized.
	Protection of one's own installations		In combat against combat forces of the enemy-mainly against aircraft carriers, missile carriers, and to a certain extent also submarines-the first place belongs to manned aviation.
	Against communication lines of the enemy		Against shore installations of communication lines (see above); in operations against sea (ocean) objectives of communication lines, manned aviation plays a direct and essential role, and also in support of submarine operations.
Operations on communication lines	Protection of one's own communication lines	Close	Plays a large role
		Distant	At the present time it cannot protect distant communication lines. In the future it will protect sea transport and will also carry it out directly.

Thus, at sea the relative weight of shore-based aviation not only remains high (with the assimilation of missile weapons by aviation), but in the future it will increase still more.

What kinds of aircraft are needed for operations in sea (ocean) theaters?

First and foremost, if this is not prevented by other circumstances, seaplanes, in particular, flying boats (lodka), are most advantageous, not only with regard to their ease of basing (both on a strip of water near the shore and deep inside the country), but also because, in a number of cases, by landing on water in the course of accomplishing their mission they may increase their range. It is really unnecessary to speak in this regard about aircraft specially designated for coordinated operation with submarines, for conveying supplies to them, or, on the other hand, for receiving supplies, in particular, fuel, from submarines.

Other demands on naval aviation must be outlined mainly depending on the planned area of its operations. In regard to aviation for coastal waters, it can manage without special range, although for some classes of aircraft, for example, reconnaissance aircraft, antisubmarine, and PVO aircraft guarding convoys, greater range would be useful. To the extent that this is "our zone" and we must always have air superiority here, especially high speed for these aircraft is not required, the main need is for excellent means of surveillance (including detection of submarines) and weapons.

On the other hand, especially great range and maximum speed (now not less than 1800 to 2000 kilometers per hour) in order to have the capability of evading an air enemy with superior forces are required for ocean-going aircraft. It should not be said that the best way to fulfil both demands will be secured by a transfer to nuclear power, the introduction of which to aviation, however, should be given most serious attention.

In the first volume of the secret military-historical essay The Navy of the Soviet Union in the Great Fatherland War 1941-1945, it is justly said that the main striking force of the Navy in World War II was aviation. Despite the systematic utilization of naval aviation for operations on ground axes, owing to the situation which arose, it still occupied the first place in inflicting losses on the enemy at sea. At the same time, it is noted in this work that by

the beginning of the war "qualitatively, our aviation...in the navy was significantly inferior to the aviation of the enemy..." (page 76). Only 12.5 percent of the aircraft were new types; the remaining types were obsolete. "The lag of aircraft in a technical sense, principally in speed, and also their numerical deficiency in each of the operating fleets, created significantly difficulties in the initial period of the war" (page 62). Everyone knows what urgent and most energetic measures were required in order to correct this situation. And even long before the war, a basis already existed for considering that aviation in the near future would occupy the place of the basic striking force in combat operations at sea and, in addition, in the Basic Considerations in the Development of the Navy (VMS) of the Workers' and Peasants' Red Army (RKKA) during the Second Five-Year Plan it was indicated that "The most important and decisive role must belong to submarines and heavy aircraft" (page 46).

Such are some conclusions, not so much from a theoretical, as from a practical, underestimation by us of the significance of aviation in operations at sea before the last war. There is no doubt whatever that on the basis of attentive study of the experience of the last war, exhaustive analysis of the new requirements of the situation, the powerful development of Soviet science and technology, and, finally, the gigantic potential of our industry, we shall not repeat the old mistake.

Of course, in a journal article one may take up the question being examined only on a very general plane. But its importance urgently demands the most attentive and detailed examination of both the question as a whole, and of all its individual facets.